Support for the amendments to claim 4 is found in the present specification on page 5, lines 20-21 and on page 12, line 3. Support for the amendments to claim 11 is found in the present specification on page 10, line 21.

**Issues Under Drawings**

The Examiner objected to the drawings for the reasons stated in the Notice of Draftpersons Patent Drawing Review (PTO-948). Attached herewith is a corrected formal drawing for Figure 1.

**Issues Under Specification**

The Examiner objects to the specification because Application No. 08/980,523 has issued as a U.S. patent. Applicants have amended the specification to indicate that U.S. Application No. 08/980,523 has issued as U.S. Patent No. 6,310,181. Therefore, Applicants respectfully request reconsideration and withdrawal of the objection.

The Examiner also objects to the specification on page 24, line 8, through page 25, line 5 for each of the reasons that claim 11 is rejected based on indefiniteness under 35 U.S.C. § 112. Applicants respectfully submit that 35 U.S.C. § 112, second paragraph, is directed to a requirement that the claims be definite. Nevertheless, Applicants have amended page 24 to correct clerical errors and to insert SEQ ID NO: information adjacent to the references to Figure 1A. Therefore, Applicants respectfully request reconsideration and withdrawal of the objection.

**Claim Objections**

Claims 1-6, 11-13, and 19 are objected to by the Examiner because claims 1-6, 11-13, and 19 each recite "FRS2 polypeptide" or depend from a claim which recites "FRS2 polypeptide". The Examiner suggests that the first time in the claims that the term "FRS2 polypeptide" is used, it is written out in full, followed by the abbreviation in parentheses. Applicants have amended claim 4 to recite "Fibroblast Growth Factor Receptor Protein Kinase Substrate 2 (FRS2)". Support for this amendment is found on page 5, lines 20-21 of

the specification. Therefore, Applicants respectfully request reconsideration and withdrawal of the objection.

**Claim Rejections - 35 U.S.C. §112, Second Paragraph**

Claims 1-6, 11-13, and 19 are rejected by the examiner under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants respectfully request reconsideration and withdrawal of the rejection.

The examiner asserts that in claims 1-6, 11-13 and 19 the recitation "FRS2 polypeptide and FRS2 protein" is unclear. The examiner asserts that while the specification recites a number of preferred structural or functional activities for the FRS2 polypeptide, it is unclear which of these characteristics are necessary limitations of the polypeptide encoded by the claimed nucleic acid.

Applicants have canceled claims 1, 3 and 19, thus rendering the rejection of these claims moot.

With respect to the pending claims, Applicants have amended claim 4 to specify that the FRS2 polypeptide is a polypeptide comprising "at least 10 contiguous amino acids of SEQ ID NO: 1". This amendment is supported by the present specification on page 12, line 3. Additionally, Applicants have amended part (c) of claim 11 to specify that the nucleic acid molecule encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1. This amendment is supported by the present specification on page 10, line 21. Therefore, the claims satisfy the requirements of 35 U.S.C. § 112, second paragraph.

The examiner asserts that claim 11 is indefinite for the reasons recited in the Office Action. Applicants have amended claim 11 to comply with the requirements of 35 U.S.C. § 112, second paragraph.

The examiner asserts that in claim 11, the recitation of "hybridizes under highly stringent conditions" is indefinite because the specification allegedly does not define what

conditions constitute "highly stringent". Applicants respectfully disagree. However, in order to expedite prosecution, Applicants have amended part (c) of claim 11 to recite that the nucleic acid molecule encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1. This amendment is supported by the present specification on page 10, line 21.

Finally, the examiner asserts that claim 19 is indefinite for depending from cancelled claims 18, 17 and 7. Applicants have canceled claim 19, thus rendering the rejection moot.

**Claims Rejections - 35 U.S.C. § 112, First Paragraph**

A. Claims 1-6, 11-13 and 19 are rejected by the examiner for lack of written description. The examiner asserts that the claims are directed to all possible nucleic acids encoding any FRS2 polypeptide and recombinant cells or tissues comprising said nucleic acid. Applicants respectfully request reconsideration and withdrawal of the rejection.

Applicants have canceled claims 1, 3 and 19, thus rendering the rejection of these claims moot.

With respect to the pending claims, as discussed above, Applicants have amended claim 4 and part (c) of claim 11 to recite that the FRS2 polypeptide is a polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO: 1, and that the nucleic acid molecule encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1, respectively. These amendments find support in the specification as described above. Therefore, claims 2, 4-6 and 11-13, as amended, comply with the written description requirement under 35 U.S.C. §112, first paragraph.

Claims 1-6, 11-13 and 19 are also rejected by the examiner for lack of enablement. The examiner asserts that while the specification is enabling for a nucleic acid encoding a FRS2 polypeptide having the amino acid sequence of SEQ ID NO: 1, it does not provide enablement for any nucleic acid encoding a FRS2 polypeptide. Applicants respectfully request reconsideration and withdrawal of the rejection.

As discussed above, Applicants have amended claim 4 and part (c) of claim 11 to recite that the FRS2 polypeptide is a polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO: 1, and that the nucleic acid molecule encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1, respectively. A person of ordinary skill in the art would not endure undue experimentation to make a FRS2 polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO: 1. Nor would a person of ordinary skill in the art endure undue experimentation to make a nucleic acid molecule that encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1. Therefore, claims 2, 4-6 and 11-13, as amended, comply with the enablement requirement under 35 U.S.C. §112, first paragraph.

**Claim Rejections - 35 U.S.C. § 102**

Claims 1, 3, 4 and 11 are rejected by the examiner as being anticipated by Ottilie et al. Applicants respectfully request reconsideration and withdrawal of the rejection.

Applicants have canceled claims 1 and 3, thus rendering the rejection of these claims moot.

With respect to claims 4 and 11, these claims, as amended, are not anticipated by Ottilie et al. Claim 4 requires that the nucleic acid molecule encode a FRS2 polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO: 1. The first 6 amino acids of the sequence of Ottilie et al. and SEQ ID NO: 1 share sequence homology. However, the rest of the amino acids in the two sequences share almost no homology. Applicants attempted to perform a Blast alignment of SEQ ID NO: 1 and the sequence of Ottilie et al., however; there were no regions of homology identified. Therefore, the largest region of contiguous amino acids shared between SEQ ID NO: 1 and the sequence of Ottilie et al. is 6 amino acids. Additionally, the sequence of Ottilie et al. does not satisfy any of the requirements of claim 11. In particular, since the Blast alignment did not identify any regions of sequence homology, the sequence of Ottilie et al. does not share 90 % sequence identity to the amino acid sequence of SEQ ID NO: 1, as stated in part (c) of claim 11. Furthermore, since the sequence of Ottilie et al. encodes a polypeptide encoding no more than 6 contiguous amino

acids of SEQ ID NO: 1, it is not possible that the sequence of Ottilie et al. encodes a polypeptide having the full length amino acid sequence of the sequence set forth in SEQ ID NO: 1 except that it lacks the following segments of amino acid residues: 1-10, 11-152, or 153-508 (part (d) of claim 11). Therefore, claims 4 and 11 are not anticipated by Ottilie et al.

**Claim Rejections - 35 U.S.C. § 103**

Claims 1, 2, 4, 5, 6, 11, 12, 13 and 19 are rejected by the examiner as being unpatentable over Wang et al. The Examiner asserts that based on many of the shared characteristics of the SLP protein taught by Wang et al. and that of the FRS2 protein of the instant application, the nucleic acids that encode a SLP protein are thought to be encompassed by nucleic acids that encode a FRS2 polypeptide. Applicants respectfully request reconsideration and withdrawal of the rejection.

Applicants have canceled claims 1 and 19, thus rendering the rejection of these claims moot.

With respect to claims 2, 4-6 and 11-13, Applicants have amended claim 4 and part (c) of claim 11 to recite that the FRS2 polypeptide is a polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO: 1, and that the nucleic acid molecule encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1, respectively. Additionally, Applicants note that Wang et al. fails to disclose any sequences for the SNT-like proteins discussed in the paper (the paper says SLP is a SNT-like protein). It is the Examiner's burden to provide evidence to support that the claimed sequence shares sequence identity or homology with the prior art sequence. Absent some suggestion from the Examiner as to whether the sequence of Wang et al. has any sequence identity or homology with the amino acid sequence of SEQ ID NO: 1, Applicants maintain that the claimed invention is not obvious over Wang et al.

## CONCLUSION

As the above-presented amendments and remarks address and overcome all of the rejections presented by the Examiner, withdrawal of the rejections and allowance of the claims are respectfully requested.

If the Examiner has any questions concerning this application, he or she is requested to contact the undersigned.

Respectfully submitted,

Date October 23, 2002

By _____

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Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 19-0741 for any such fees; and applicant(s) hereby petition for any needed extension of time.

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION:**

On page 1, the first full paragraph under Related Applications:

This application is a divisional of U.S. Serial No. 08/980,523, filed December 1, 1997, now U.S. Patent No. 6,310,181, which is incorporated by reference in its entirety (including any drawings), and claims priority to U.S. Provisional Application 60/032,093.

On page 24 and bridging page 25, the second full paragraph:

Another aspect of the invention features an isolated, enriched, or purified nucleic acid molecule comprising a nucleotide sequence that: (a) encodes a polypeptide having the full length amino acid sequence set forth in Figure 1A (SEQ ID NO: 1); (b) the complement of the nucleotide sequence of (a); (c) hybridizes under highly stringent conditions to the nucleotide molecule of (a) and encodes a naturally occurring FRS2 protein; (d) encodes a FRS2 polypeptide having the full length amino acid of sequence set forth in Figure 1A (SEQ ID NO: 1) except that it lacks one or more of the following segments of amino acid residues 1-10, 11-152, or 153-508; (e) is the complement of the nucleic acid sequence of (d); (f) is a polypeptide having the amino acid sequence set forth in Figure 1A (SEQ ID NO: 1) from amino acid residues 1-10, 11-152~~,~~ or 153-508; (g) is the complement of the nucleic acid sequence of (f); (h) encodes a polypeptide having the full length amino acid sequence set forth in Figure 1A (SEQ ID NO: 1) except that it lacks one or more of the domains selected from the group consisting of a myristylation region, a phosphotyrosine binding region, and a C-terminal region; (i) the complement of the nucleic acid sequence of (h); (j) encodes a polypeptide ~~of~~ as set forth in (a), (d), or (f) containing one or both of the mutations tyrosine 349 to phenylalanine or tyrosine 392 to phenylalanine; or (k) the complement of the nucleic acid sequence of (j).

**IN THE CLAIMS:**

2. (Amended) The nucleic acid molecule of claim [1] 11, where the nucleic acid molecule is [isolated, enriched, or] purified from a mammal.

4. (Amended) A nucleic acid probe for the detection of a nucleic acid molecule in a sample, wherein said nucleic acid molecule encodes [encoding] a [FRS2] Fibroblast Growth Factor Receptor Protein Kinase Substrate 2 (FRS2) polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO: 1 [in a sample].

5. (Amended) A nucleic acid vector comprising [a nucleic acid molecule encoding a FRS2 polypeptide] the nucleic acid probe of claim 4 and a promoter effective to initiate transcription in a host cell.

6. (Amended) A recombinant cell or tissue comprising [a nucleic acid molecule encoding a FRS2 polypeptide] the nucleic acid probe of claim 4.

11. (Amended) An isolated, enriched, or purified nucleic acid molecule comprising a nucleotide sequence that:

(a) encodes a polypeptide having the full length amino acid sequence set forth in [Figure 1A] SEQ ID NO: 1;

(b) is the complement of the nucleic acid sequence of (a);

(c) encodes a FRS2 polypeptide having at least 90% sequence identity to the amino acid sequence set forth in SEQ ID NO: 1[hybridizes under highly stringent conditions to the nucleotide molecule of (a) and encodes a naturally occurring FRS2 protein] ;

(d) encodes a FRS2 polypeptide having the full length amino acid sequence of the sequence set forth in [Figure 1A] SEQ ID NO: 1 except that it lacks one or more of the following segments of amino acid residues: 1-10, 11-152, or 153-508;

(e) is the complement of the nucleic acid sequence of (d);

(f) is a polypeptide having the amino acid sequence set forth in [Figure 1A] SEQ ID NO: 1 from amino acid residues 1-10, 11-152, or 153-508;

(g) is the complement of the nucleic acid sequence of (f);

(h) encodes a polypeptide having the full length amino acid sequence set forth in [Figure 1A] SEQ ID NO: 1 except that it lacks one or more of the domains selected from the group consisting of a myristylation region, a phosphotyrosine binding region, and a C-terminal region;

(i) the complement of the nucleic acid sequence of (h);

(j) encodes a polypeptide [of ] as set forth in (a), (d), or (f) containing one or both of the following mutations: tyrosine 349 to phenylalanine or tyrosine 392 to phenylalanine; or

(k) the complement of the nucleic acid sequence of (j).

[12] 13. A recombinant cell or tissue comprising a nucleic acid molecule of claim 11.